

PRESENCE
OF
TELLURIUM IN COPPER.

BY
Thomas
T. EGLESTON, PH.D.,
NEW YORK CITY.

A PAPER READ BEFORE THE AMERICAN INSTITUTE OF MINING
ENGINEERS, AT THE HARRISBURG MEETING, OCTOBER, 1882.

AUTHOR'S EDITION.

1882.

T N 780
E 35

PRESENCE OF TELLURIUM IN COPPER.

BY T. EGLESTON, PH.D., NEW YORK CITY.

(Read at the Harrisburg Meeting, October, 1882.)

SOME months ago samples of black oxide of copper and of pig copper from Colorado were sent to me to examine for arsenic and antimony. I examined them both by the blow pipe, and in the wet way, but found none present.

A quantity of this material was purchased by a large metallurgical works, but when they attempted to refine it they pronounced it to be full of arsenic and antimony, so much so, that their furnaces were, as they said, "poisoned," and rendered unfit for refining. I then re-examined the samples, and at the same time some of the material which had "poisoned" the furnaces, and found no traces of arsenic or antimony when the usual amounts for analysis were used, but on taking very large amounts I found traces merely, in some parts of the sample, but not in all. As it was a matter of interest to ascertain what the white substance that "poisoned" the furnace was, I sent to the works making the black copper, and obtained some of the matte from which the black copper was made; I took careful samples, both of it and the black copper and the refined copper. I then found the impurity to be tellurium, a substance not heretofore known as occurring in copper. I give below one analysis of the matte, two of the black, and one of the refined copper:

	Matte.	Black Copper.		Refined Copper.
Copper, ...	55.02	97.120	98.090	99.705
Gold, ...	0.06	—	—	—
Silver, ...	0.40	0.132	0.128	0.135
Lead, ...	17.87	0.777	0.757	none.
Zinc and nickel, ...	2.22	0.070	0.100	0.024
Iron, ...	4.18	0.130	0.080	0.031
Sulphur, ...	20.02	0.236	*	trace.
Tellurium, ...	0.12	0.093	0.097	0.083
Arsenic, ...	*	0.006	*	0.091
Slag, etc., ...	—	1.270	0.192	—
	99.89	99.834	99.444	100.069

* No traces were found with the blow pipe.

23-5105 2.7.1882

The mattes and the black copper are results of the treatment of copper ores with the tellurium ores of Colorado. In the laboratory no traces of white fumes were shown on charcoal, but when the metal in the furnace was subjected to the process of "dry-roasting," as was unintentionally done, very dense white fumes were given off. When refined and cast into cake, it had the ordinary appearance of cake copper. It was then reheated for rolling in the ordinary way, showing no signs of impurity. At the first pass in the rolls, very fine cracks showed themselves, which opened in succeeding passes. At a thickness of about 0.03 meter the cracks on either side nearly penetrated the cake, and at about 0.008 meter it began to fall to pieces. It was heated and rolled at different temperatures, but always with the same result.

When cold the metal is tough and malleable. Although the cakes in the moulds showed no coating, when they were heated repeatedly and allowed to cool in the air they became covered with a white powder, which proved to be the oxide of tellurium. The copper, as it comes from the cake moulds, has every appearance of being good copper.

This is the first time, so far as I know, that the presence of tellurium has been detected in commercial copper. But very little of it is removed in the treatment, as the four analyses show.

It is surprising how very small a quantity renders the copper red short, and consequently worthless for rolling.

